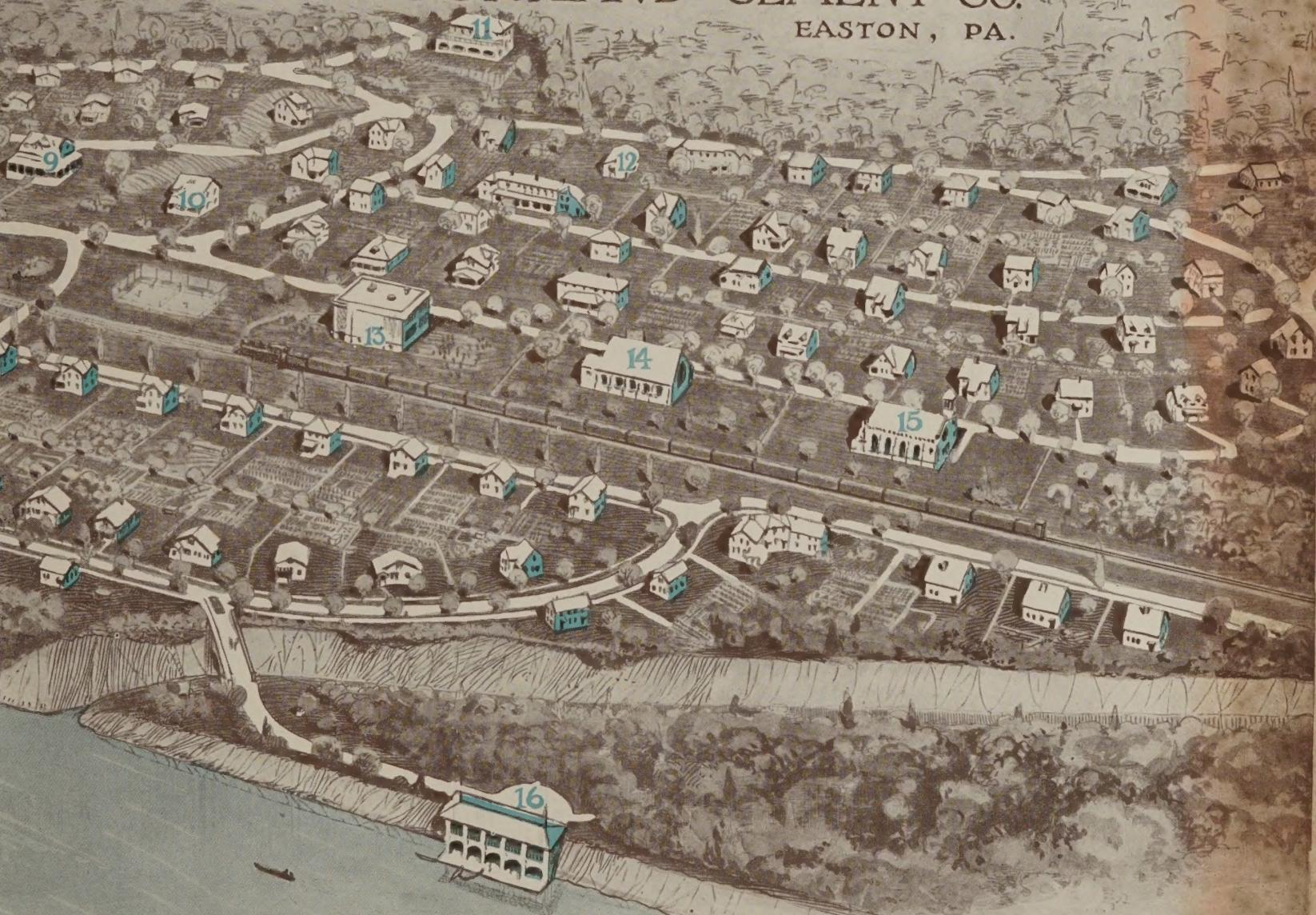


ALPHA AIRDS

No. 10 Issued in the interest of
Buyers, Sellers and Users of
PORTLAND CEMENT by
ALPHA PORTLAND CEMENT CO.

EASTON, PA.



Proposed Development for Housing Employees of
ALPHA PORTLAND CEMENT Co., at Plant No. 5 MANHEIM W. VIRGINIA



VICTORY'S FOUNDATION

WHILE the great war was confined to the nations of Europe, the people of the United States enjoyed unparalleled prosperity.

Today we have the greatest resources of any nation on earth.

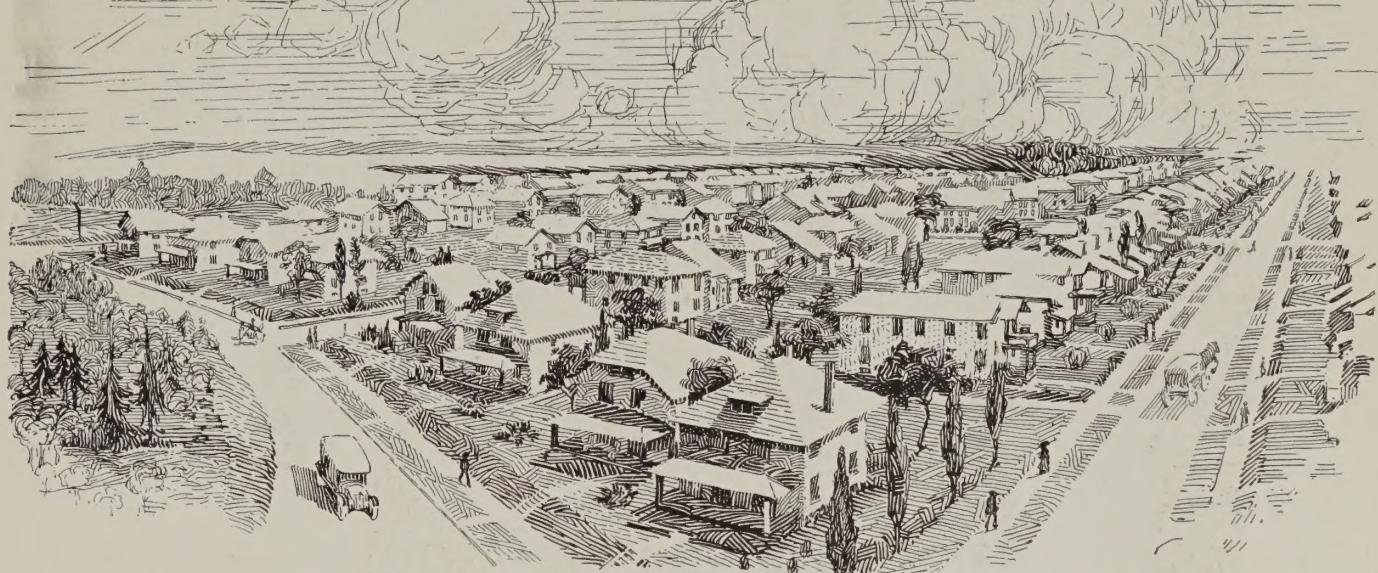
Now that American soldiers, American ships, American airplanes, and American supplies must decide the issue, it is the duty of every citizen to take Liberty Bonds to the very limit of his ability.

Let the call of our Government for more money be answered promptly, heartily and unmistakably. No one else can do your part. Don't wait. Apply at once for your bonds to your Local Committee or to your bank.

Alpha Portland Cement Company
General Offices: Easton, Pa.



A CONCRETE CITY



Drawn from a view of Morgan Park, Minn. (near Duluth), a handsome industrial city of concrete homes, pavements and streets, built by the Minnesota Steel Co.

IN the great turn-about that the world has had since the summer of 1914 a decided change has come in building conditions. Certain types of building work have slowed up considerably. Other classes of work have been rushed. Factory additions, to furnish war material and necessary goods that formerly came from Europe, have been completed at high speed. Military cities, with their barracks, hospitals, supply houses, auditoriums, and the like, have sprung up.

In the flurry that was natural over the entry of the United States into the war, it was to be expected that in some of the building operations service and permanence would be sacrificed for speed. The *New Republic* says in one of its recent issues:

"Housing for the workers employed in shipbuilding is assured under the act appropriating \$50,000,000 for this purpose. But it is not enough to be assured that the workers who are to build our ships will not altogether lack shelter. What kind of houses are to be built, what arrangements are to be made for the kind of community life that will keep the workers contented, are questions for which we still anxiously await an answer. Are our housing authorities going to content themselves with the erection of flimsy shacks to be pulled down as soon as the war is over, or will they build for permanence, recognizing the fact that the problem of housing our workers will remain with us after the war, and that any contribution they may have made toward its solution will fall to the credit of their industrial statesmanship? These are ques-

tions that presented themselves to the British government early in the war. The economy and speed of construction of temporary shelters were thoroughly considered. But, although the prospective drain of the war upon British resources was incomparably greater than the drain we have to face, the British government decided in favor of permanence in its housing plans. The argument for permanence is even more cogent now, when it is coming to be clearly understood that the world has entered upon a struggle for substantial democracy—democracy that takes economic as well as political conditions into account."

Industrial cities have, like the cantonments, sprung up at many points throughout the country to accommodate either a newly organized force of workingmen or an increase to a former force. How to provide employees with suitable homes has been a live problem with employers for several years, and is to-day the most interesting phase of the building situation. Some of these industrial cities have been built with no apparent idea of permanence, safety or beauty, and the disastrous fire that almost swept the mushroom-built town of Hopewell, Va., off the map illustrates what may happen.

It is the purpose of this issue of ALPHA AIDS to set forth what may be accomplished at reasonable cost and by a variety of building methods in the constructing of small concrete houses that are attractive as well as permanent, safe and comfortable.



AS DESIGNED BY
BALLINGER & PERROT
ARCHITECTS AND ENGINEERS
NEW YORK AND PHILADELPHIA

Industrial Housing Problems

By LESLIE H. ALLEN, Aberthaw Construction Co.

IT is reported from Bucyrus, Ohio, that one manufacturing concern recently brought 150 employees to the city by great effort; after a few days thirty remained, the other 120 left, having failed to secure comfortable homes.

In Derby, Conn., one company was compelled to sub-let to out-of-town concerns over \$800,000 worth of work, which could easily have been done in the city if it had been possible to bring more mechanics to the city and house them.

Six cement companies, who recently analyzed their labor turnover for a period of three years, report an average of 103% per annum. A prominent public service corporation near Philadelphia confessed recently to a labor turnover of 1100%, and, although this is exceptional, a turnover per annum of 400% is not uncommon.

These cases are typical of widespread conditions. During the past two or three years employers of labor in all of our big industrial centers have experienced such great difficulty in getting and keeping employees that much attention has been focused upon the employment situation. The results of many investigations have shown that one of the prime causes for the shifting population and large labor turnover of many industrial plants is the utterly inadequate housing accommodations available for the industrial worker.

In years gone by wages were low and the cost of turnover was hardly considered, for there was always a long line of new men waiting for a job, and, because of this excess of supply of men over demand, a man was not so ready to throw up his job and seek another. He would put up with poor housing conditions for the sake of having any job at all. But in the present labor situation, with demand far exceeding the supply, the workman will no longer be content with the disgraceful housing conditions he has had to put up with. He rightly objects to sleeping six or eight in a room big enough for two, turning out of his bed in the morning just in time for the night-shift man to take his place; and as fast as manufacturers bid for his services by putting up decent houses

(as many are now doing) he is going to leave the old insanitary overcrowded centers to go to the new villages where he can live decently and comfortably with his wife and family.

The Effect of the Present Crisis.—Very little is being done at the present time to remedy this state of affairs, owing to the fact that the present abnormal prices of labor and building materials have shut off the supply of houses. Heretofore the demand for houses has been supplied by the speculative builder and the real estate operator. But at the present time he can no longer afford to build—in many cities he cannot get construction loans, and even if he does, he cannot hope to sell in the open market at present prices and cannot be sure of any return on his money by renting, having in mind a possible trade depression during the re-construction period which will come at the end of the war, so that, while the demand for better houses continues, the supply is getting less and less. In view of the probability that the labor situation will not change for four or five years after the close of the war, the manufacturer is faced with the very serious problem of how best to compete in the labor market for his needs, with the knowledge that housing is an important factor in which he will get no help from local investors as in former years.

He has long felt that the housing problem is one to which he ought to give serious attention. He has disliked doing so, and for good reason, but the present crisis is forcing upon him the conviction that he has got to tackle it, and that in the future he ought to control it.

The Effect of Bad Housing on Industry.—Apart from any consideration of this subject from the humanitarian or sentimental side, the industrial employer is beginning to realize the tremendous importance of these conditions in their relation to production.

He is finding out that men who are housed in unhygienic and unsanitary dwellings are not so healthy, not so efficient, lose more time through sickness, and are more stupid and troublesome in the plant.

ALPHA AIDS

Statistics computed in Chicago and elsewhere have proved conclusively that the areas having maximum density of population coincide with those having the highest percentage of tuberculosis and other contagious diseases, crime and social evil.

The output of a plant is seriously affected by the prevalence of sickness which is so often caused by the insanitary surroundings of the workman's house and the overcrowding inside. With open privies or cesspools in the back yards, and wells within twenty feet, typhoid is an ever imminent danger; with overcrowding and lack of opportunity for personal cleanliness, tuberculosis and other diseases flourish; these reduce the regularity of the men's attendance at work and the production of the plant.

We are at last beginning to realize that people who live in pig-sties are likely to be and to act like pigs. If we want respectable and intelligent men and women to work for us in our plants, we must see that they have decent, healthy and comfortable homes.

The interest of the employer in the health of the employee is being shown in better sanitary accommodations in the factory, the provision of drinking-water fountains, shower baths, rest rooms and hospitals, and in recreation parks and club rooms, athletic associations, etc., and in some cases in the sale of wholesome food for the workers to eat during their dinner hour. And in so doing he has recognized the importance to his plant of happy, healthy employees. The provision of decent houses for them is but a short step further.

The human tool is not unlike the machine tool in this respect—the better it is housed and cared for the greater will be its efficiency and its output.

And so it is that we find in city after city and in many rural communities industrial plants are putting our large sums of money in building model villages or model homes for their working people. It is being recognized that in order to secure good workmen and to hold them it is necessary not only to provide work for them to do but

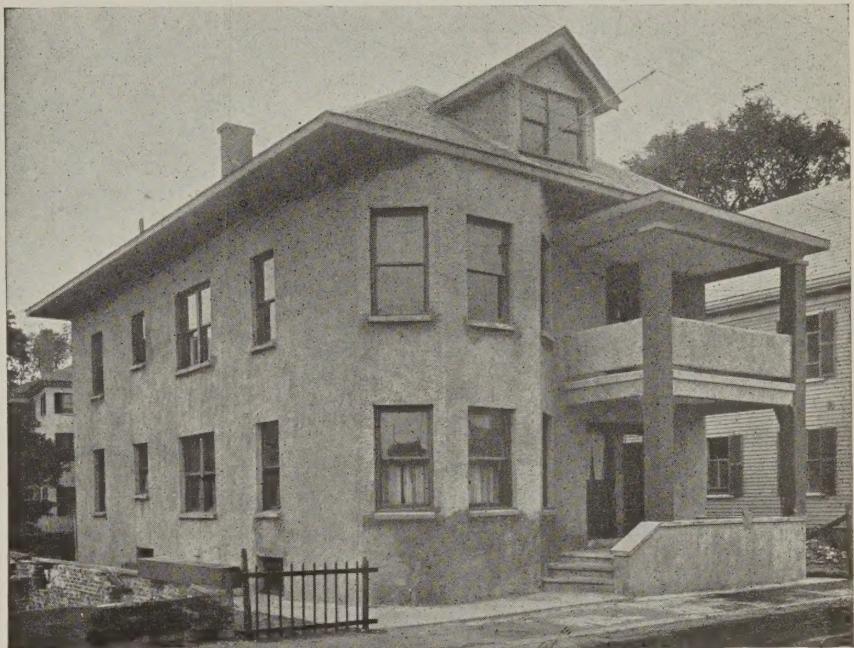
to provide good houses for them to live in. It is no longer safe or good policy to leave this matter to chance or to the irresponsible real estate speculator.

In February last the writer was discussing this matter with a textile manufacturer who said there might be some point in what was said, but he did not feel it was important enough in his plant, as the supply of houses took care of the demand. In September the writer saw him again. Fifteen per cent of his machinery was idle, because his help would not stay. He stated that the cost of the houses he should have built in the spring would all have been returned to him in the profits on the output of his idle machinery.

The Employer's Responsibility.—Many experts think that it is undesirable for the manufacturing corporation itself to own houses and sell or rent them to the worker, if this can be properly taken care of by other parties. In spite of this, many corporations have been doing this successfully and maintaining harmonious relations

with their work people. At the present time, with prices of building work at their present level, the employer is being forced into this field. No longer can a manufacturer build a large plant and find houses springing up all around it without any effort of his. The workers are the motive power of any factory plant, and the employer who builds a new plant to-day without building houses near by finds himself like a locomotive without fuel. Even in large cities, such as Bridgeport, Akron, and many others, the manufacturers themselves have had to combine to raise the necessary capital to take care of and remedy the housing situation.

It must first be recognized that we have two classes of workmen to be considered: (1) The unskilled workmen, mostly foreigners or negroes, uneducated, unused



Two-Family Concrete House Erected in Salem, Mass., After the Great Fire



A Group of Attractive Poured Concrete Houses at Newark, Ohio

ALPHA AIDS

to American houses and American standards of living, earning a very low wage; and (2) the skilled men, mechanics, machinists, etc., earning a higher wage, mostly Americans, living according to American standards, demanding more and willing to pay more for the comforts that the foreigner does not consider essential. The result of a failure to distinguish these two classes is that at the present time nearly all the houses built are American houses for skilled workmen, and the need for better houses for unskilled labor has remained unsatisfied, resulting in overcrowding getting worse and worse. Here and there, as in Philadelphia and Washington, a most excellent attempt has been made to solve the problem of housing the unskilled, low-paid workman. Such examples have not been copied and only serve to show up more sharply the mistakes of other cities.

Housing Essentials.—The essentials of a modern city house may be summarized as follows:

- Watertight roof, walls and floors.
- Bedroom for parents.
- Bedroom for male children.
- Bedroom for female children.
- Living-room for cooking, eating and general day use.
- Private toilet-room with sanitary water-closet and sewer connection.
- Suitable heating arrangements.
- Running water supply fit for drinking.
- Uninterrupted daylight and ventilation through windows in every room.
- Sink in kitchen, with running water and waste.
- Further additions required by the American family and considered necessary by them:

 - Cellars.
 - Closets.
 - Bathtub with running water.
 - Window screens.
 - Separate parlor.
 - Desirable improvements which usually are added:

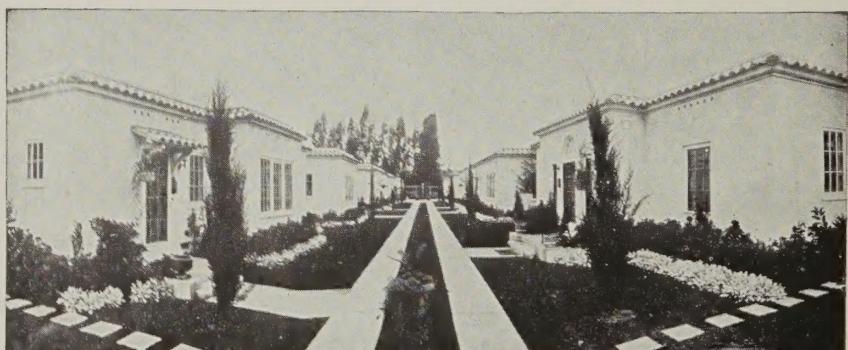
 - Porches and piazzas.
 - Lavatory bowl.
 - Hot water supply to bath and bowl.
 - Window shades.
 - Window blinds.
 - Dining-room separate from parlor or kitchen.
 - Electric lighting or gas piping.
 - Wall-paper.
 - Laundry tubs.

Need for Economy.—Any attempt such as the above to divide essentials from luxuries must come in for a good deal of criticism, as there is bound to be a difference of opinion upon the details of such a list. The classifications suggested will at least serve to indicate the lines upon which the planning of a house should be studied in view of the need for strict economy in designing and building necessary to bring buildings down to a cost that will be remunerative.

It is generally agreed by economists that the working man cannot afford to pay more than one-quarter of his monthly wage in rent. This means that the man earning an average of \$12.50 a week cannot afford to pay more than \$150.00 per annum. Assuming that a housing operation ought to pay at least 10% gross per annum, this gives \$1,500.00 for purchase of lot with sewer and street improvements and the building of a house. At the present time a four-room house of good construction cannot be built for this money and it is therefore necessary to plan with the very strictest economy.

Many of the workmen whose homes we wish to build have come from countries where four walls and a roof are considered a sufficient shelter from the elements to make the home. Although we do want to see them housed in a better manner than this, yet it is not necessary to give them a six-room house, large cellar, furnace heat with running water, laundry tubs, lavatory bowls, picture-mouldings, and all the other comforts and luxuries that are required by higher-paid workmen. We do want to house the lowest-paid man in a sanitary and hygienic home, but it is not necessary that his home be furnished

(Continued on page 7)



The Two Upper Views Show Some of the Gunite Cottages at Cornwells, Pa.
Lower View Is a Group of Cottages in California, Built of Gunite

ALPHA AIDS



Building 100 Concrete Houses as One Job



NE of the most interesting concrete house operations is the community of one hundred dwellings built at Donora, Pa., for the American Steel and Wire Company by the Aberthaw Construction Company of Boston, Mass. The following details are taken largely from an article published in the *Engineering News-Record*:

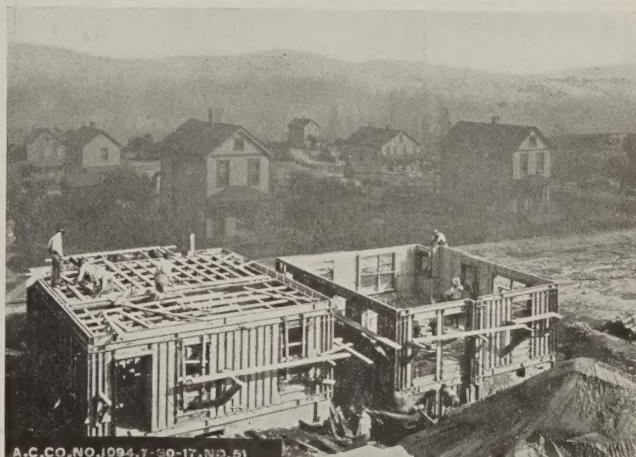
The site of the development is about 40 miles outside of Pittsburgh and is located on a steep hill above the Monongahela River. The property has been laid out into 156 lots, of which 100 are now being built upon and the remainder will follow next year. Grading was done and streets laid out by the American Steel and Wire Company, concurrently with the house building. The plan is to have concrete streets and granolithic sidewalks.

The houses were designed by the Lambie Concrete House Corporation, of Boston, Mass., and are of eight different styles, containing some four, some five, and some six rooms, all with a bath and cellar. Of these, a few are built in pairs with party walls, and the remainder are all detached. The contract prices for a house complete range from \$2,000 to \$3,300, but such costs are based on prices of some time ago and can hardly be used for present comparison. The costs include gas furnaces and cooking ranges, electric lighting and the usual improved kitchen and bathroom equipment. The average floor area is 26 X 26 feet.

A typical house layout is shown on page 6. The houses are all of the box type with 6-in. solid concrete walls reinforced vertically on both faces and horizontally on the outer face with straight rods, with an intermediate partition wall cutting down the floor spans to 12 to 15 ft. The floors are of the ribbed reinforced-concrete type, with the ribs or beams spanning between the outer and interior walls. These ribs are left exposed in the cellar, but in the other floors plaster board is nailed to strips left in the concrete and a finish plaster coat made. The

buildings are finished at the top with a reinforced concrete cornice in which a gutter is formed, and on top of the concrete ceilings a roof is built up of spruce framing covered with asbestos slate, so that the whole of the exterior of the building, with the exception of this frame, the wooden window and door frames, and wood stairs, is fire-resisting.

The forms used in this undertaking are of the special steel channel type patented by the Lambie Concrete House Corporation. They consist of 9-in. channels set up vertically and connected together with clips and wedges passed through slotted holes in the flanges of the channels. At the corner of the building a 4 X 4-in. steel angle is set up, and the forms are lined up longitudinally by means of a steel channel used to form a belt course. This not only fastens the forms of the lower floor, but is bolted into the floor reinforcement and remains in place for a support for the second-story forms and is only stripped at the last when all the concrete is poured. The steel wall forms also support the floor forms, which are steel domes, arrangement being made by which the steel channels



A.C.CO.NO.1084,T-50-17,NQ.51

Casting the First Floor with Lambie Forms

ALPHA AIDS

on which the domes are laid are bolted to the inner side of the steel wall forms. The cornice has to be built inside special wood forms supported by wooden struts reaching down to the belt-course channel form.

The cellars were excavated with a steam shovel which went down a street, taking out a strip the depth of the houses. The space between the walls of the houses is backfilled after the cellar walls are placed. The digging was in hardpan with some shale, but all of it was taken out by the steam shovel.

The construction of the houses proper is done in groups, to fit the number of sets of forms, which are taken down as soon as possible and moved on to the next group.

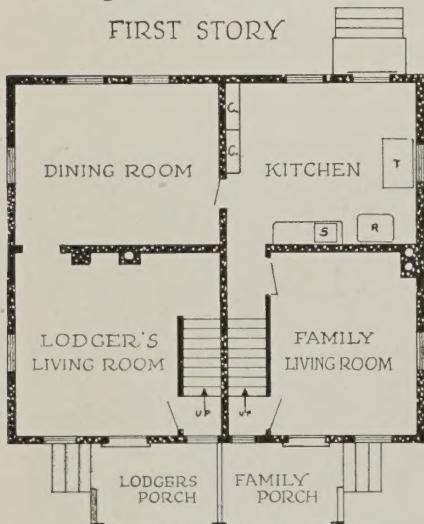
The usual method is to set the forms for one story—wall and floor together—and then to pour the concrete for this section all at once. The progress of the job is limited by the setting of the concrete.

To form, pour and strip, each story takes about seven days. Working at this rate, the house of two floors and cellar is completely concreted

in three weeks, and with the twelve sets of forms on the job, twelve houses are concreted in this period. After this the plumbing, heating, plastering, roofing and finish are done, which take about five weeks more. The houses were completed at the rate of twelve in the first eight weeks and twelve every three weeks thereafter.

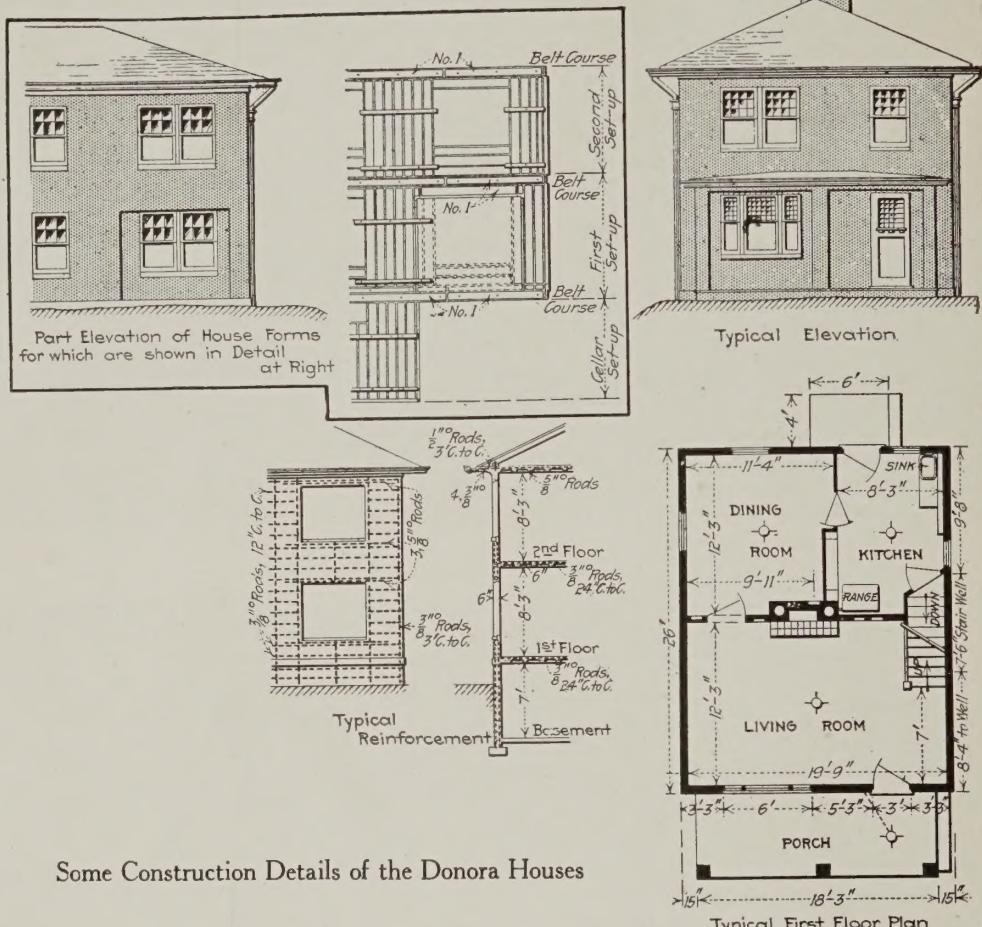
During the first three months of construction the

FIRST STORY



A Very Practical Arrangement for a Boarding House

6

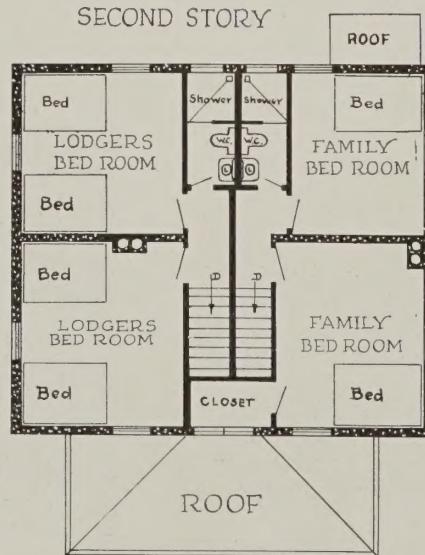


Some Construction Details of the Donora Houses

progress made was as follows: twenty-eight complete houses, counting double houses as one, were concreted in twelve and half weeks, or at the rate of a house every three days. After the job was well under way the work proceeded more rapidly. Two houses were completed in thirteen calendar days from the erecting of the basement forms to the concreting of the roof.

The number of men in a concrete gang varied from 13 to 15, according to the type of house and the amount of concrete to be poured. On a large-type six-room house group this force has taken approximately $1\frac{1}{2}$ days to erect basement walls and first-floor forms, including all boxes, window frames, flues, etc. Concreting basement walls takes about $2\frac{1}{2}$ hours, and $1\frac{1}{2}$ hours to pour the floor. Stripping and erecting the basement wall forms on the first story takes $1\frac{1}{2}$ to 2 days. The stripping of the first-story walls and erecting the second-story and putting on the floor takes about $1\frac{1}{2}$ days, but the putting on of the cornice is a slower operation and adds from half a day to a day to this. Concreting the walls takes about $2\frac{1}{2}$ hours, and the roof about

SECOND STORY



ALPHA AIDS

the same length of time.

The steel reinforcement varies from $1\frac{1}{2}$ tons in the smallest type of single houses to three tons in the largest type of double houses.

The quantities of concrete per house vary from 145 cu. yds. for the largest double house down to 85 for the smaller single houses. This includes all walls and floors, footings, pavings, porches and chimneys.

Industrial Housing Problems

(Concluded from page 4)

with all the conveniences and appurtenances that are being considered necessary in the American home. We should give him a house that will not harbor vermin, that will not be damp or unhealthy, a house in which every room has a proper amount of light and ventilation and direct sunlight, and that has decent privacy in its sanitary accommodations and sufficient bedrooms for the sexes to sleep apart.

The various types of dwellings now in use are as follows:

- (A) Single houses of five to seven rooms.
- (B) Two-family houses of four to seven rooms.
- (C) Terrace or row houses of four rooms and up.
- (D) Apartment-houses or tenements, two rooms and up.
- (E) Boarding-houses for single men.
- (F) Hotels.

The single house is the ideal residence for the American family, but is beyond the means of the low-paid unskilled workman. A single house with five or six rooms with 3,000 feet of land cannot be built for less than \$3,000, except in the cheapest kind of frame construction, and even at this price it would call for a higher rental than he can afford to pay. For higher-paid men in the plant the single house is very desirable.

The two-family house is often built for workers who wish to purchase their homes. Though not suitable for the unskilled worker, they are quite attractive to higher-paid men who like to buy a two-family house so that

the rental received from one-half of the house will help to pay the carrying charges and amortization of the whole house. In some cases these are built side by side with a party wall and in some cases one tenement is built above the other. The first-named is preferable, as there is more privacy.

For Safety and Permanence

The numerous fires which, according to newspaper reports, have occurred in the various cantonments throughout the country, have shown conclusively the fallacy of the principle of constructing all buildings, especially warehouses and hospitals, of wood. This seems to mark with special emphasis the folly of erecting the large receiving and similar hospitals in any other manner than through the medium of a construction that is, if nothing else, fire-resisting; especially so, where such hospitals are in thickly populated localities, and, therefore, subject to the acts of incendiaryism that are apparently so prevalent throughout the country.

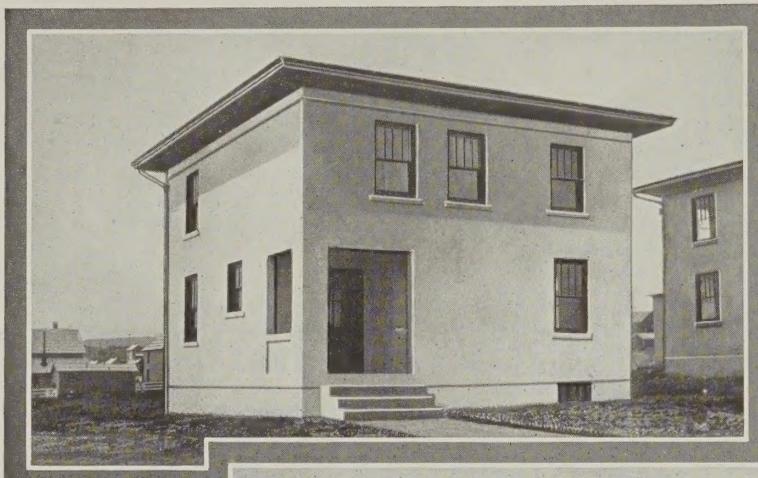
It has been one of the claims of the officials of the War Department that speed was the requisite feature, and that speed only could be obtained by the use of wooden construction, and that of the flimsiest and most destructible type. Experience has proven that these officials were not justified in this claim, by the fact that a great many of the cantonments, although it was definitely thought they would be completed by September 6th, are still in a partially completed state.

Stucco construction, when built up with high-grade cement mortar, has time and again proven its effectiveness in the prevention of a spread of fire; offers a possibility of insulation against cold and heat that cannot be obtained through the medium of wooden walls; and where buildings, such as the proposed hospital, are projected, can introduce an additional type of labor that will diversify the operations and will therefore introduce a greater speed.—From *Bulletin of Corn Exchange Bank of Philadelphia*.



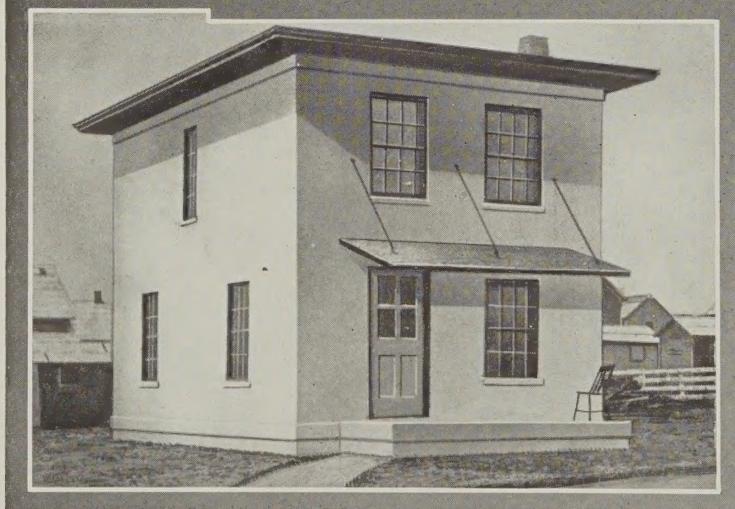
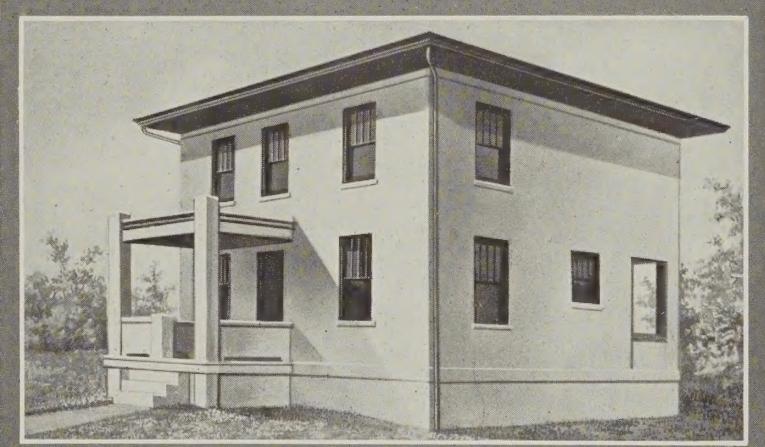
Bird's-eye View of Donora Colony, Showing Most of the Houses Practically Completed
Concrete Pavements and Sidewalks to be Constructed

ALPHA AIDS



Inexpensive
Four-Room
and
Six-Room
Houses
Built for
Mine Workers
at
Cairnbrook,
Pennsylvania

Illustrations
Furnished
through
Courtesy of
Lambie
Concrete
House
Corporation



The Most
Simple
House Is
Substantial
and
Comfortable
when Built
of Concrete

HOUSES BY THE PRE-CAST SYSTEM



Permanent Homes Being Erected by Alpha Portland Cement Company

AS suggested by the cover page of this issue of ALPHA AIDS, the Alpha Portland Cement Company practices what it preaches, and is engaged in building a number of permanent homes for its working force at the No. 5 plant at Manheim, W. Va. This, however, is not the only point at which the company has built or is building concrete dwellings for its employees. The houses now being erected are of the "Simpson-Craft" type. The system permits the construction of reinforced concrete practically without forms, the greater portion of the work being pre-cast of minimum sections, made with the idea of using common labor in erection. In some types of buildings, erected by this system, no plaster or stucco is used, though the appearance of the exterior can be varied by the use of large plane surfaces stuccoed. For the miscellaneous small houses, outside of dwelling houses, no plaster is used for the exterior, but for dwellings, it has been found that the continuous air spaces within the outside walls of the building, together with the introduction of heavy waterproofed felt, helps to make the building dry and warm in winter and cool in summer.

The construction consists of wall and floor slabs, together with belt and sill courses, floor beams and roof rafters made of standard sections and sizes for individual pieces. They may be assembled in any combination desired, so that while each building is made up of standard units, the general design may be varied, making it possible to produce a large number of buildings, using the standard units, but varying the exterior treatment.

The pre-cast sections of the buildings are made on casting tables or in moulds. This may be done either at the building site or in the yard or shop, and shipped to the site. If they are shipped, the sections may be packed in fine broken stone, sand or gravel, and the latter may be used at the site as an aggregate forming the studs, which are field-cast and form the binding element for the buildings. All of the pre-cast members entering into the construction are so designed that the metal with which they are reinforced projects beyond the end or edge of the pieces. In assembling the pre-cast sections in the buildings, they are spaced at intervals on the walls, leaving a space between the two sides of sections, and are then clamped together temporarily by means of channel

shaped wood or metal forms covering the two open sides of the intervening spaces and forming a pocket into which reinforced bars are placed. The inside face of these pockets has a series of holes spaced about 7" on centers, into which are placed large wire hairpins. The pockets formed by the forms are filled with concrete, forming the studs of the building and binding all parts together.

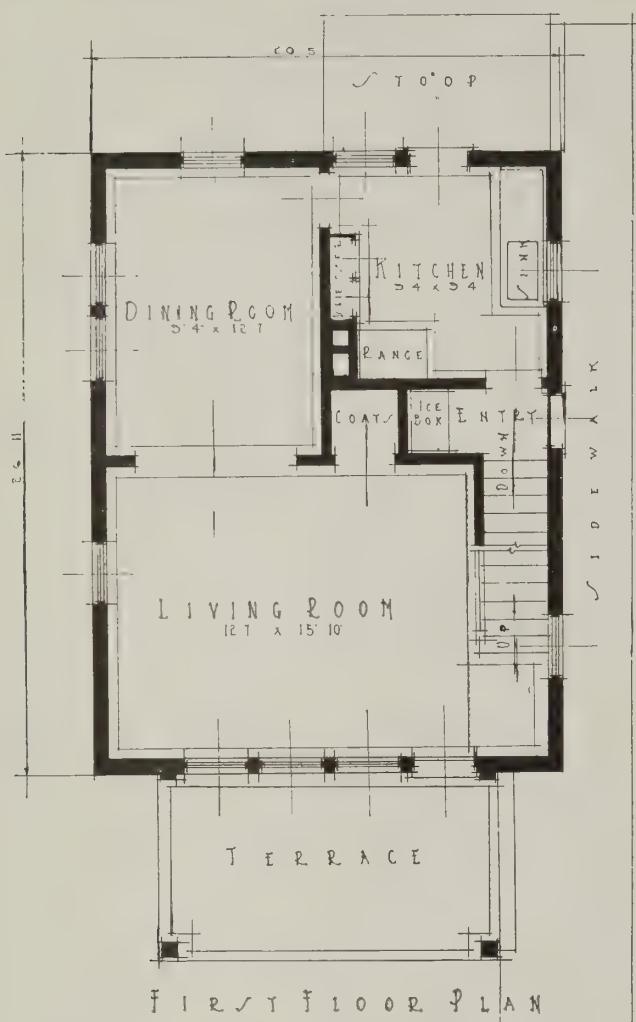
The reinforced concrete beams of the floor construction, which are pre-cast, rest on the top of the wooden forms of the studs, the ends of the concrete beams, with their reinforcements, projecting into the pockets. When the casting is complete, the end of the beam rests directly upon the stud, and is securely anchored.

Upon the removal of the field forms, heavy waterproof building paper is placed against the inside face of the studs, beginning at the ceiling line and working down toward the floor, lapping the paper 4" at each joint, and securing the edges to the window and door frames. After this paper has been applied, hyrib self-centering or other ribbed lath, is placed with the ribs against the paper, forcing the ends of the hairpin through the opening in the lath. Through these openings is then placed a heavy wire or tenpenny nail, and the loops of the hairpin twisted down onto the wire, thus anchoring the lath permanently to the stud. The same method is used in securing the lath to the ceilings, though, if desired, the paper may be omitted.

Grounds for the securing of wooden base, picture moulds, etc., are secured to the lath, or "spot" grounds may be used for this purpose; the walls and ceilings are then ready for plastering. Studs for the interior partitions are all pre-cast. Reinforcement for these studs project from the upper ends, the stud being of full height between the top of the floor slabs on which it rests and the under side of the floor beams. Between the top of these studs and the top of the floor beams, a distance of twelve inches, is cast a girder or plate, binding the ends of the floor beams together and distributing the load over the studs. This permits of the variations in spacing of the studs for door openings, etc.

Roofs may be formed in a manner similar to the floors, using slabs directly on top of the reinforced concrete rafters. Where cement tile is used for roofing, the tile may be laid directly upon the reinforced concrete roof

ALPHA AIDS



House Being Erected at Alpha Plant

slabs. For other types of roof covering, dovetailed lath are built into the top surface of the roofing slabs, forming nail spaces for the roofing material.

The finished floors of the building may be of any material, such as wood laid on sleepers in the standard way, plastic surface such as Asbestolith, Taylorite, etc., or by the standard method of using a wood base with the sanitary cove, forming a carpet strip and filling in the space between the cove and the floors with Portland cement finish, the method used in many first-class hotels at the present time. This makes a particularly high-grade sanitary floor, and one that is economical to construct. By using care to secure a hard finish a concrete floor can be obtained that will be absolutely dustproof.

Treads and risers forming stairs for this type of house are pre-cast in one piece, also sections of the chimneys, mantels, and other parts of the building; they are set and built into place as the buildings progress.

The foundation walls may be either a solid 8" concrete wall on top of a concrete footing, or formed in the same manner as the walls in the building above grade. In the latter case, however, the slabs forming the walls would be 2" thick instead of $1\frac{1}{2}$ ", which is the standard thickness of the wall slabs.

Many designs of surfaces for outside walls may be obtained by the use of selected aggregate. The standard method is to finish the slabs under wood float, touching

up the edges of the studs after they have been cast in the field.

Dry joints are used in assembling all the parts, though in casting the studs, all parts of the building are thoroughly grouted, forming a construction analogous to the placing of panels in the doors.

As the building is constructed entirely of fireproof materials, the spaces between the beams and ceilings, also the spaces between the studs and all partitions, may be readily used for heat and ventilating flues. In some of the smaller types of houses, the entire building may be heated and ventilated from the top of the cooking stove by a special device, thus making it necessary to have

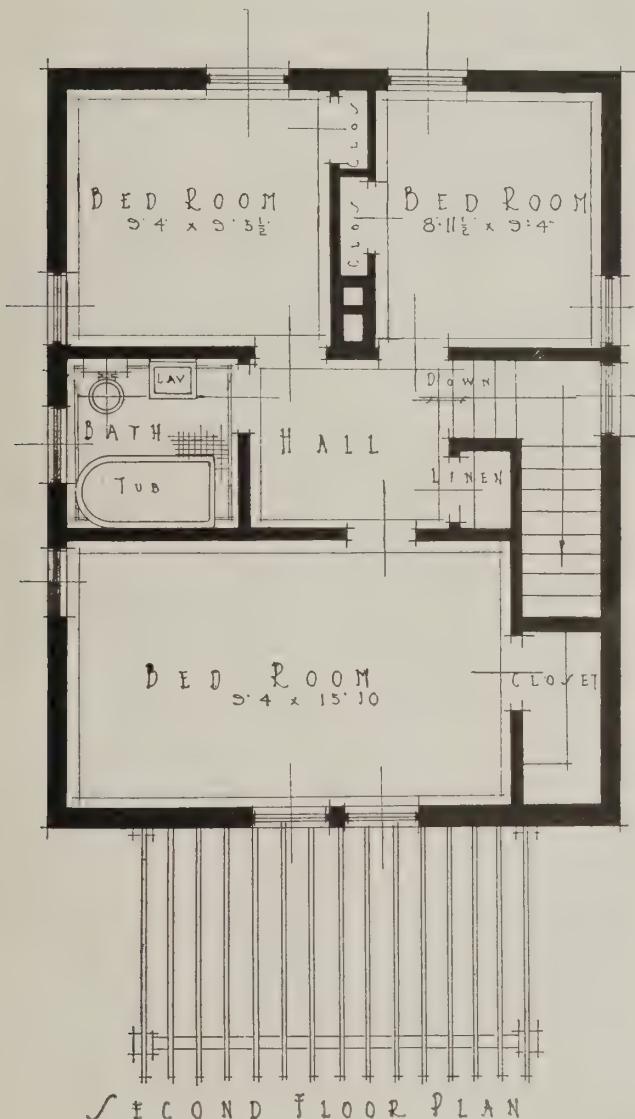


**Perspective Views of Simpson-Craft Houses at Alpha Plant,
Manheim, W. Va.**

ALPHA AIDS

only one fire in these small buildings, and at the same time, not only heat but ventilate the rooms.

With a degree of skill on the part of the workman, in sections where sand and gravel or fine crushed stone from stone crushers are available, buildings constructed on this type will cost only a little more than first-class frame construction.



House Being Erected at Alpha Plant

The types of houses adopted by the Alpha Cement Company for their employees vary from five-room semi-bungalow type to the cottage type of six rooms and bath.

The construction here described, known as the Simpson-Craft method, is the invention of John T. Simpson, of Newark, New Jersey, for many years President and Designing Engineer of the American Concrete Steel Company of that city.

The illustrated headpiece at the top of page 9 is drawn from a view of houses of the type here described erected at Lansford, Pa., for the Lehigh Coal and Navigation Company. A sheet giving some detail drawings of the pre-cast system of house construction will be sent free on request by the Alpha Cement Service Department, Easton, Pa.

A Rat Census

Says the *Scientific American*: "Some interesting figures about the rat population of Kansas have been compiled for the Federal food administrator of that state. Working with figures of European rat surveys made just before the war, it is estimated that the rat population of a city like Wichita is probably equal to the human population, while in the country districts there are at least 10 rats for every person. A fair estimate would give 3,000,000 rats for Kansas, each requiring \$2 worth of food a year, a \$6,000,000 loss."

The cure for the rat evil is concrete.

Service Sheets on Concrete Houses

The Alpha Portland Cement Company will be glad to send manufacturers and responsible property-owners, engineers, architects and contractors, Service Sheets giving additional helpful details on good types of (1) poured concrete houses, (2) pre-cast concrete houses, and (3) stucco houses. Address ALPHA Service Department, Easton, Pa.

Alpha Cement—How to Use It, 96 Pages, Illustrated

About one per cent. of the space in Alpha literature is used in telling how we make cement as good as it can be made. The other ninety-nine per cent. is used in practical directions about concrete construction—form-building, calculating of quantities, waterproofing, fireproofing, and building ideas covering scores of different types of small structures. If you haven't a copy of this Handbook, it will be a valuable addition to your collection of practical books.



Pre-cast Beams and Slabs aptly called "Concrete Lumber"



Industrial Houses Constructed with Expanded Metal Lath and Metal Lumber

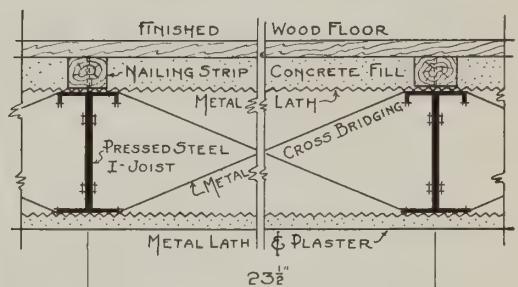
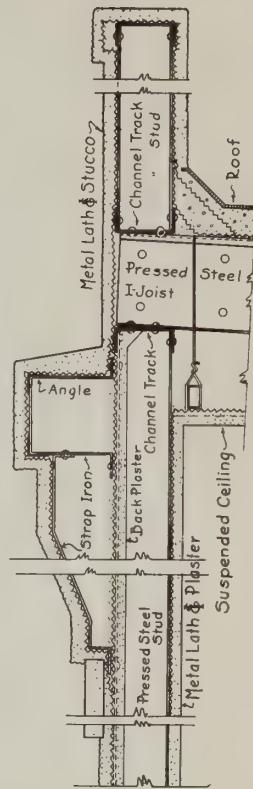


FRONT ELEVATION #2-

Light, strong studs and joists of pressed steel take the place of wood in floors, roofs, partitions and walls.

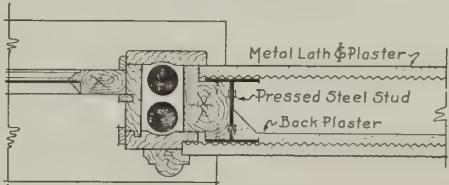
All metal lumber comes to the job cut to size.

Illustrations and data through courtesy of Berger Manufacturing Company, Canton, Ohio.



CROSS SECTION
SHOWING
FLOOR CONSTRUCTION

SECTION SHOWING EXTERIOR
WALL & WEIGHT BOX
CONSTRUCTION



Building with Metal Lumber

By A. H. BROMLEY, Jr., Canton, Ohio



METAL lumber is found forging to the front among the systems of construction available to meet the "need of the hour," namely, fire-resisting, sanitary and economical homes. The materials required to construct these houses should be products not in demand by the Government for armament, ammunition, or ship-building. These conditions are met by the use of pressed steel in the gauges used for the fabrication of metal lumber and the lighter gauges used for metal lath; also in the concrete and wall materials which involve the use of Portland cement, sand and gravel or broken stone, all of which are among the most available and widely distributed materials used in the building business.

Economy is secured by this method as both the "weight-bearing" metal lumber and the fire-resisting concrete and mortar are used in minimum quantity because of the scientific design and proportioning of the materials of construction. Every ounce of material is in active service, and being used for the purpose for which it is best fitted.

Metal lumber consists of pressed steel studs and joists, which make it possible to construct fire-resisting and vermin-proof walls, partitions and floors with minimum of materials and utmost speed in erection. The application of metal lath, which entirely encase the metal lumber frame and joists, serve to stiffen the structure. This forms, with the concrete floor fill, plastering and stucco, a building which is practically a unit and perfectly rigid, and with the decided advantage of being warm in winter and cool in summer.

This type of construction does not furnish merely a fire-resistive exterior wall or shell such as would be afforded by masonry walls and wood interior construction, but also serves to prevent the partitions from acting as flues in conducting fire from one floor to another.

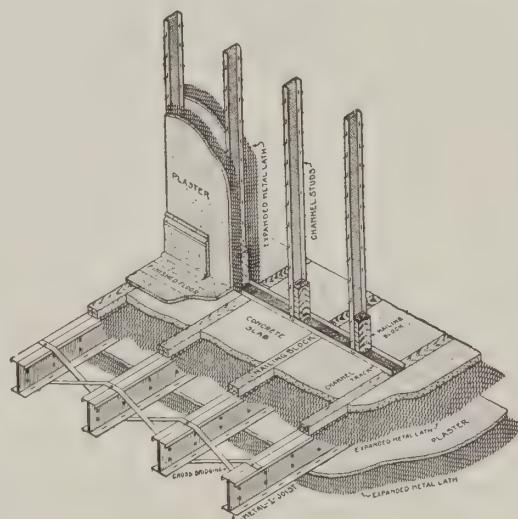
An extensive practical investigation is being carried out by the Bureau of Standards of the United States Government on the permanency of the commonly used types of stucco of various types of mixture on various bases. This test comprises 56 panels, each 10 X 15 feet, each panel containing a window or door. Nineteen of these panels include the use of metal lath. The four metal lath panels comprising Group 3, constructed with metal lath attached to studs without sheathing and lath back-plastered (identical with the construction illustrated on page 12), has practically the full rating given reinforced concrete and brick walls, upon which basis all comparisons are made.

A feature worthy of note in connection with this type of construction is the ease with which variation can be secured in the exterior details, such as window heads and sills, together with ornamental effects, such as bands or brackets.

An inspection of the design of these houses as shown in the illustrations on page 12 indicate, first: a structure composed of pressed steel sections, scientifically designed, and based on the use of steel of special analysis and heat treatment, to give greatest structural strength,

permanence and elimination of internal stresses; second, the elimination in the walls and partition construction of inflammable material.

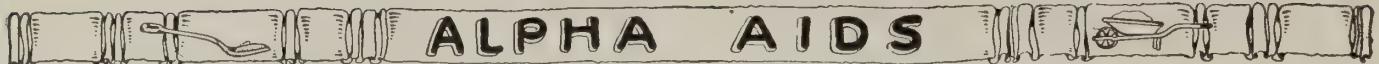
The floor construction in this type of house consists of pressed steel I-joists, spaced to afford maximum economy with proper construction. The wood finish floor is readily and rigidly secured to the upper part of the joists by means of 2" X 2" wooden nailers or sleepers, which are secured to the joists by nails being driven between the two channel sections forming the I-joists. Between these 2" X 2" nailers and resting on the projecting shoulders of the upper flange of the I-joists is a 1³/₄" reinforced concrete fire-resisting slab. This slab, in addition to the ceiling plastering (which is also applied on metal lath), serves as a protection to the structure. The walls and partitions as designed are likewise adequately protected by the cement stucco on the exterior and the plastering on the interior of the building.



Material of this nature is furnished with each member identified by marks, and accompanied by complete erection diagrams. When it is considered that the building consists entirely of "one-man material," wherein no heavy equipment is required for handling or erection, the construction method is particularly attractive at this time where the question of the conservation of labor is a vital issue.

Consider Bulk Cement

There is now a price-difference in favor of bulk cement of fifteen cents a barrel. Considering the additional saving brought about by the elimination of lost, stolen and ruined bags and return freight on bags, it is safe to figure on a saving of twenty-five cents a barrel when bulk cement is used. This amounts to \$57.75 on a carload of 231 barrels of cement, or to \$250 on a thousand-barrel job. It's something that will stand thought. May we send you a pamphlet that will help you to see whether or not you can use bulk cement to advantage?



Opportunities for the Rural Contractor



IFFERENT conditions, all or nearly all of which have arisen from our entrance into the war, have been responsible for a slackening of general building activities. Naturally some of this slackening has been because of war's demands on commonly used structural materials, such as steel and wood. Does the rural concrete contractor realize, however, that these seemingly adverse conditions are really favorable to him?

If there is one best selling argument for concrete, it is that materials that otherwise would be waste products are put to useful constructive ends. There is nothing consuming about concrete construction. It represents the true conservation idea that should be and is in perfect harmony with our present national aims. Even cement is made of what would otherwise be a useless material, and the bulk of the materials of concrete are sand and pebbles or broken stone, which also lie useless in the pit until put to the permanent constructive ends which they reach in any concrete structure. The materials of concrete being found almost everywhere, building projects planned for concrete represent the use of local materials; thus the already overburdened railroads are not still further taxed when their every effort is needed to meet the demands of war.

Do all rural contractors realize in fullest measure the meaning of the above

statements? If they do, they will find their promotive efforts meeting least resistance in putting over contracts during the coming year for the many and various buildings that will be needed in every rural community. We are urged toward conservation in every way; also toward

greater production; but greater production may avail little if staple products of the soil, for instance, are not properly housed until they can be shipped to consuming centers.

Waste of foodstuffs through the depredations of fire and rats is enormous. Concrete builds out both fire and rats. Every available resource must be conserved. In the building line no material so fully fits the conservation scheme as concrete. We believe it is going to be a year of building in the rural communities, and in the small towns. Conditions will fortunately force a greater favor

for concrete than that material has ever before known.

Is the rural contractor awake to these latent opportunities? The town needs a small public garage. The local coal dealer needs fireproof bins for coal storage to in every way safeguard this fuel against fire. The local grain dealer needs concrete grain bins to conserve against fire and rats. Many a farmer needs a concrete machine shed

because he is going to increase his mechanical equipment this year to make the lessened farm labor more efficient and thus to help save man power needed by the Government.

Many of the small buildings that the rural community requires should, for every reason which we so well know, be of concrete.

Neither labor nor materials will have to be transported by rail. Design for such buildings as have been mentioned above can be so largely standardized that any skilled contractor can deliver build-



Concrete Tile and Stucco Houses at Youngstown



A Concrete Market Shelter

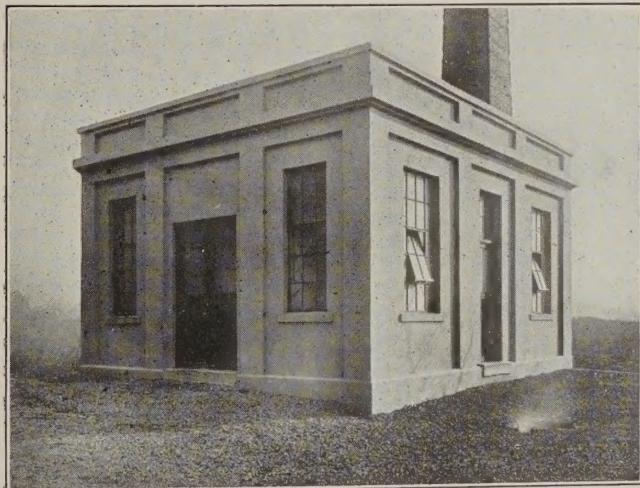
ings fully 100 per cent. efficient. Concrete can be used for most of the structures mentioned either in the form of block or monolithic construction. Fruit and vegetable growing centers need storage caves or warehouses, in the construction of which no other material than con-

ALPHA AIDS

crete should enter. The local garage, whether public or private, needs safeguarding against fire from without and should safeguard adjacent structures by being built of fireproof material. Such a building can often be made to serve a double purpose. If two stories are planned, the upper one can appropriately be fitted up for local club or lodge use. Warehouses, power houses, coal bins or pockets, all demand concrete construction because the business involved needs safeguards which concrete insures.

Here and there the argument is advanced that prices of materials have risen to such a point that the wisdom of building now is to be questioned; but we are in an era of high prices and those best fitted to judge by comparison with past times, are of the opinion that the prices of two or three years ago will never again prevail. As a matter of fact, cement, which constitutes only a relatively small volume of the total materials required in concrete construction, has advanced in price less than other building materials.

Farmers are prospering beyond their wildest dreams. They are cashing in on big crops, and if reports may be relied upon, the acreage planted this year will greatly exceed that of last year, and with no greater average production per acre should result in still more stupendous crops, with corresponding returns to invest in farm buildings or what not. The average rise in price of building materials has amounted to less than 30 per cent. The rise in price of farm and many manufactured products has been from 100 to 300 per cent. or more. With the same quantity of wheat, corn, oats, etc., as before the war, the farmer can build two houses, two barns, two corncribs, two of any kind of building that he may want. Instead of going down, prices are more likely to go up. Building is cheaper now than ever.



Attractive Power House

The average structure is four walls and a roof. There may be one or more floors. Standardization of concrete design where nothing ornate is desired is so possible that the contractor need be only a builder. Engineers have worked out slab and column design for different loads and spans. It is merely necessary to adapt established standards to the needs of a particular business

to be housed. Such standard tables with respect to residences, for instance, and some types of commercial buildings have been arranged in handy chart form by the Portland Cement Association and can be obtained by those interested without charge or other obligation.



Permanent Garage of a Popular Type

The Alpha Portland Cement Company has a series of Service Sheets giving good ideas for the construction of more than a score of rural and other small- or medium-sized concrete structures. These sheets are sent free to interested architects, contractors or property owners.

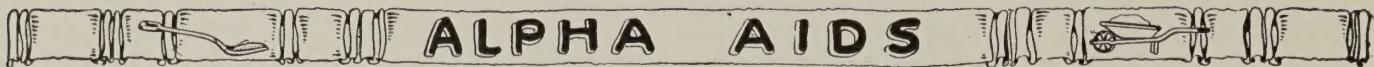
Now more than ever before is the time to get out and sell concrete on its many merits, but particularly the merit of conservation, which fits in so harmoniously with the Nation's needs to-day.

Just Two Ways of Solving Food Problem

Mr. Hoover said, that whether we like it or not, we must deal with the food problem of war in one of two ways: There is not enough food to go around if we stick to the lavish methods of peace times. Rising prices, coupled with depreciation of money, due to issues of war bonds in every country, which make the purchasing power of money shrink, compel us to adjust the food supply to the world's appetite, either by controlling that supply in ways that lead to economy and make it suffice, or by letting wages rise as prices rise, to keep pace roughly with fluctuations. Even an amateur economist can see at a glance that food control is better than wage increase, because wage increase is a crude force operating slowly, unevenly and with great injustice and suffering to millions of workers. The wages of many workers do not rise—the professional men, clerical workers, public employees, and so forth. Russia tried the experiment of letting wages adjust themselves to the diminishing food supply, and it did not work.

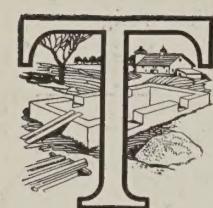
Concrete Paving on Steep Grades

Concrete paving has often proved its adaptability to steep grades. So far as is known, the steepest grade upon which concrete has been used is in Los Angeles. The Portland Cement Association, 111 West Washington Street, Chicago, has recently distributed a photographic reproduction of Baxter Street, Los Angeles, showing the concrete pavement mentioned, where grades range from 11 to 29 per cent., and yet some people say concrete is not suited to steep grades.



By the Way

Prosperity and the War



HERE'S food for thought in an editorial contained in a recent issue of *Industrial Canada*, published at Toronto. It might be well if those in the United States who have been haunted by vague fears of industrial calamities and economic disasters following our entrance into the World War could read this editorial and take heart. It says:

"Whether we like to admit it or not, the war has made pretty nearly everybody in Canada prosperous. Those who aren't prosperous have themselves largely to blame for it. Looking about us, we see more genuine prosperity scattered around than ever before in the history of the country. People are better dressed; they have more comforts in their homes; they eat nicer things; and most of them enjoy themselves more than they ever did.

"Canada has borne the strain of war for more than three years. It has experienced terrible losses in men, and the flower of its youth is in the army. It has borne greater economic burdens than the United States may be called upon to bear. Canada's industries were at first paralyzed by the war. Reality values fell. Building was at low ebb. Canada has got its second wind. It knows just what the war is costing and what it will probably cost in lives and treasure. It has shouldered its burden, and now if not experiencing normal conditions, it at least has resumed to a great extent the interrupted course of its economic life. It is building factories, stores, dwellings. It has learned that the best and safest way to conduct the economic affairs of the country is to naturally develop the resources of the land, to construct needed improvements—to lead, in short, so far as compatible with war conditions, a normal existence.

"How could it serve the cause of the Allies if half the workers in Canada were hunting for jobs, and there were bread lines in the large cities?"

A Boom in Farm Building

"War Profits" Going into Rural Improvements the Country Over

If the future fulfills the promises of the present, the rural districts of this country will be transformed in appearance within the next year or two. That transformation will come about through the building of bigger and better farm homes, bigger and better barns, and a tremendous increase in the numbers of bins, cribs, implement sheds, garages, hog houses, poultry houses and all the various other forms of outbuildings necessary to the business of modern farming.

The farmer, on the top wave of prosperity, is going to put his "war profits" into improvements on "the place," and those improvements will include whatever comforts and conveniences he may have lacked in leaner years.

Those who make a business of watching the trend of industrial activity say that while unprecedented prosperity is the principal reason for the widespread activity in rural building, that is not the only reason. They say the American farmer—and his wife and children as well—is just awakening to the realization that he need not deny

himself the comforts and luxuries of city homes just because he lives on the farm, and now that he has the money coming in, he is going to enjoy those advantages.

Furthermore, the farmer is finding out that his buying power, or the buying power of the commodities he produces on the farm, is, in the purchase of many desirable things, just about twice what it was a few years ago. He finds that especially true when he goes to buy building materials, and that is why he is preparing all over the country to equip his farm with modern structures, including the farm house.

A load of corn or wheat, or a bale of cotton, or a fat steer or hog will buy twice as much building material as it would even four years ago, which naturally suggests that this is a fine time to trade farm products for building material. Since the European war began the price of lumber has advanced only about 28 per cent., the statisticians say, while the prices of 96 other important commodities, including farm products, have made an average advance of 127 per cent. Why lumber prices have not soared along with the prices of most everything else is something of a mystery, but the facts remain they have not. And that is why the farmer is getting out his hammer and saw preparatory to "fixing up," before building material prices take to shooting upward.—*American Builder*.

It is significant to note the changes on our modern farms.

The decay and crumbling disintegration of the wooden structure are disappearing. Silos, barns, outhouses, roads, walks, homes, every unit of the farm glistens white in the sunshine: Cement is well-nigh imperishable. It endures.

The production of both concrete and cement, therefore, has grown to be one of the Nation's most vital industries. We build for Generations!—*Printer's Ink*.

If cement-dealers will send a selected list of farmers' names and addresses to Portland Cement Association, 111 W. Washington St., Chicago, valuable bulletins encouraging concrete improvements will be mailed free of charge.

How Much Does Your Team Pull?

A popularized report of tractive resistance on various road surfaces, made for the Good Roads Bureau of the California State Automobile Association by Professor J. B. Davidson, Division of Agricultural Engineering of the University of California, which is summarized as follows:

PULL IN POUNDS PER TON.	
Over a level, unsurfaced concrete road.....	27.6
Concrete base, $\frac{3}{8}$ -inch skin top asphaltic oil and screenings	49.2
Water-bound macadam, level, good condition.....	51.6
Concrete base, $1\frac{1}{2}$ -inch Topeka top, level, good condition.....	64.3
Gravel road, good condition, level.....	86.5
Earth road, fine dust, level	78.2
Earth road, stiff mud on top, firm underneath, level.....	81.3
Loose gravel, not packed down, new road, level.....	92.0
Earth road, stiff mud on top, firm underneath, level.....	99.3
Loose gravel, not packed down, new road, level.....	218.0
	263.0



Returns Your Money

Will it stand wear and tear?

Will it resist fire, water and wind?

Will it save on repair, paint and insurance expense?

Can it be built of easily-obtained materials?

At the end of a 10- or 20-year period will it rank high as a building investment?

These are questions that the judicious property-owner asks himself in these days of conservation and careful planning.

CONCRETE answers every question with a big YES.

Walkway

Driveway

Small Bridge

Culvert

Foundation

Barn

Gutter and Curb

Storage Cellar

Small Dam

Greenhouse

Steps

Porch Floors

Cellar Floor

Ice House

Build with good sand, stone and ALPHA Portland Cement, and the result will be a structure almost as enduring as if it were hewn out of solid rock.

Test ALPHA Cement if you prefer, but you don't have to, for it is tested hourly by chemists at every ALPHA plant, and goes out in bags stamped "Guaranteed" to meet standard specifications invariably.

ALPHA CEMENT—HOW TO USE IT (96 pages illustrated) free for the asking. If any of the following subjects interest you, special suggestions will be sent:

Septic Tank

Dipping Vat

Tanks

Tennis Court

Concrete Roof

Piers for Small Boats

Fence Posts

Gate Posts

Walls

Sills

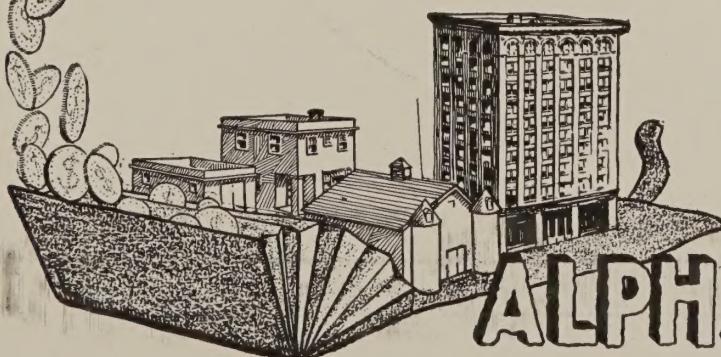
Lintels

Garages

Concrete Roads

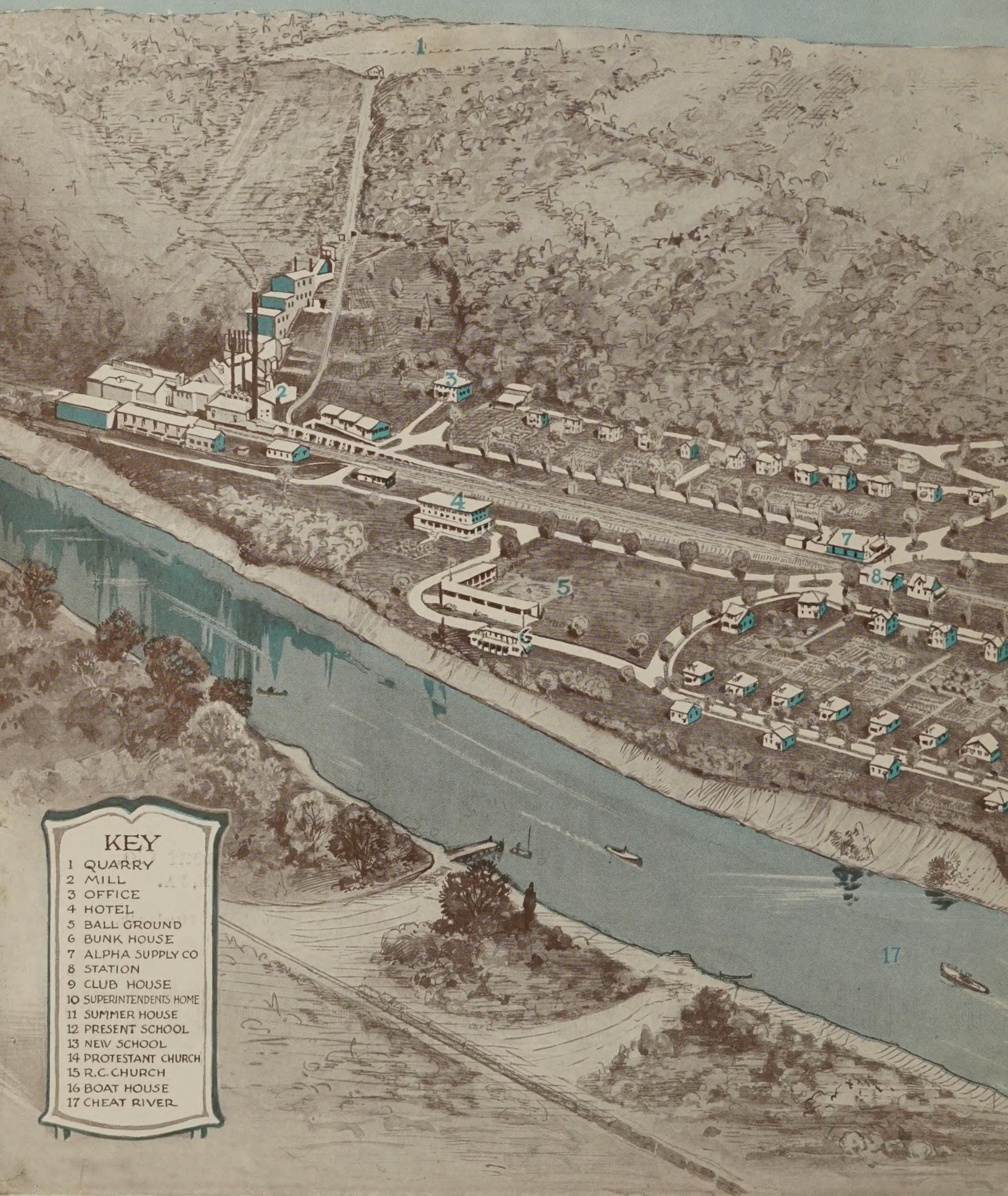
Alpha Portland Cement Co.
General Offices: EASTON, PA.

BRANCH OFFICES:
New York, Boston, Philadelphia, Pittsburgh,
Baltimore, Savannah



The Hourly
Tested and
Guaranteed
Portland
CEMENT

CONCRETE FOR PERMANENCE



KEY

- 1 QUARRY
- 2 MILL
- 3 OFFICE
- 4 HOTEL
- 5 BALL GROUND
- 6 BUNK HOUSE
- 7 ALPHA SUPPLY CO
- 8 STATION
- 9 CLUB HOUSE
- 10 SUPERINTENDENTS HOME
- 11 SUMMER HOUSE
- 12 PRESENT SCHOOL
- 13 NEW SCHOOL
- 14 PROTESTANT CHURCH
- 15 R.C. CHURCH
- 16 BOAT HOUSE
- 17 CHEAT RIVER

17